

LESSON ONE - The Layers of the Earth

Lesson Overview

Learning Objectives:

TLWBAT:

1. Identify the Earth's four layers and the main minerals that make up each layer.
2. Explain how scientists believe the Earth's layers were formed.
3. Demonstrate and define three types of boundaries: diverging, converging, and transform.
4. Describe the geological activities that occur at each type of boundary.
5. Explain how convection currents cause the mantle to flow.

Materials:

For all lessons, you will need:

- worksheets for each station (vocabulary, discussion question, computer and hands-on activity)
- book resources (enough for each student in Vocabulary and Discussion Question stations to have one)

For Lesson One, you will need:

- apples (minimum of 1 per group, maximum one per student)
- paring knife

Resource List:

A complete list of suggested resources (print and video) is available at [Resources: Print and Video](#) .

Evaluation:

1. Book Check (a mark given if all questions on the worksheets have been completed).
2. Select random questions from Vocabulary and Discussion Question Stations to mark.
3. On-task checklist for evaluating student work at the Computer Station.

Lesson One Worksheets:

Lesson One: Layers of the Earth

Vocabulary Station

Part A: Fill in the chart with information about thickness, temperature and main components of each layer of the Earth's crust.

Earth's Layer	Thickness	Temperature Range	What it is Made Of
Crust			
Mantle			
Outer Core			
Inner Core			

Part B: Fill in the following information about the two different types of crust, oceanic and continental.

	Oceanic Crust	Continental Crust
Compare Densities and Weight		
Where are Each Located		
Average Thickness		

Part C: Define each term:

Asthenosphere - Greek word meaning _____ -	Lithosphere - Greek word meaning _____ -
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Discussion Question Station

Answer questions 2 - 4 in sentence form.

1. Draw a diagram of the Earth's layers and label the crust, mantle, outer and inner core.

2. At one time, scientists believed that the Earth was made of solid rock and that the continents were in the same position in which they had formed billions of years before. It wasn't until 1912 when German meteorologist, Alfred Wegener, first developed his **Continental Drift Theory** which suggested that the continents do in fact move. However, Wegener had no proof to support his theory. What is another reason that most scientists of the time rejected Wegener's theory?

3. During the 1950s and 1960s, scientists began mapping the ocean floor and they discovered underwater mountain chains, also called midocean _____. The largest one, running about 80,00 kilometers long is called The _____.

4. We now know that the Earth is made up of two types of crust: continental and oceanic. In your own words, describe 3 things that happen when these two types of crust collide at a **subduction zone**.

Lesson One: Layers of the Earth

Hands-On Activity Station

Planet Apple - In this activity, we look at the similarities between an apple and the layers of the Earth.

Materials:

apple
knife

1. Cut an apple in half vertically. Cut each half again vertically so that there are four pieces. Cut each quarter so that each group member has an apple slice.
 2. Examine the apple. The skin of the apple represents the crust of the Earth. Just like the skin of the apple, the Earth's crust is very thin compared to the mantle and the core.
 3. The "meat" of the apple represents the mantle. The mantle is the largest of the Earth's layers and is made up of molten rock which is similar to very hot asphalt.
 4. The core of the apple represents the outer and inner cores of the Earth. The inner core is like a little round ball of nickel and iron in the middle of the Earth that is in a solid state due to the intense pressure it is under. Find the inner core of your apple slice. What part of the apple would most likely represent the inner core? _____
 5. The outer core is made of very hot metals, nickel and iron, but these metals are like a thick liquid. Why do you think the outer core liquid rather than solid? _____
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 5. Draw a diagram of your apple slice, labeling the crust, mantle and core.
6. You may eat the model of the Earth when you are done!

7. Underline or highlight the information about each of the Earth's layers you read in the section above. Be sure to include all four layers.

8. Fill in the blanks with information you have learned during this activity.

The Earth is made up of four layers. The outer most layer is the _____.

Compared to the other layers, it is very _____ .

The mantle is the _____ of all the layers and is similar to hot
_____ .

The inner core, made of the minerals _____ ,
is in a _____ state of matter due to intense _____ .

The outer core is made of the minerals _____ and _____
in a _____ state of matter.

9. Complete the word puzzle when you are finished.

Lesson One: Layers of the Earth

Computer Station

Go to the following website:

http://volcano.und.nodak.edu/vwdocs/vwlessons/lessons/Earths_layers/Earths_layers1.htm
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This should take you to a page entitled: The Earth's Layers.

Answer the following questions from the information that you read. You may answer in jot note format. Follow the on screen instructions.

1. How do many scientists believe the Earth's layers were formed as the Earth began to cool?

2. What three things happen to the Earth's crust when earthquakes occur?

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3. The oceanic crust is made up of this type of crust: _____ .
It is (less dense / denser) than the continental crust.
It is (lighter / heavier) than the continental crust.

4. The continental crust is mostly made up of this type of rock: _____ .

5. Explain how the convection currents cause the mantle to flow.